LANGUAGE ARTS TOPICS – GRADES 9-12

SPELLING

1. Enlarge speaking, reading & writing vocabulary through the use of correct spelling skills.

GRAMMAR

1. Edit punctuation to clarify meaning.
2. Verbalize common coordinating conjunctive adverbs appropriately.
3. Use modifiers effectively.
4. Articulate the changing nature of language.
5. Incorporate knowledge of the nature of the English language in reading, and in writing oral & media presentations.
6. Analyze the historical development of the English language including development of male, female and various ethnic language patterns.
7. Utilize the mechanics of the language for clear communication.

LITERATURE

1. List characteristics that distinguish literary types.
2. Summarize themes of literary works.
3. Distinguish between literal & figurative language.
4. Derive the history & culture of a people through literature.
5. Read a wide variety of literature, including themes by and about minorities and women.
6. Relate the relationship between style & meaning in literature.
7. Appraise elements of persuasion, propaganda & stereotyping techniques.

MEDIA

1. Discuss the organization of information in the library/media center.
2. Use library/media center for research using a variety of media to gain information.
3. Evaluate a variety of media for creative productions.
4. Select appropriate media for reports & creative productions.
5. Develop criteria to evaluate media presentations.
6. Develop knowledge of the practical use of computers a word processor and an information processor.
7. Evaluate a variety of media for equity.

READING

1. Differentiate between connotative & denotative meanings of words in context.
2. Make inferences from printed information.
3. Identify author's point of view & explain its function & impact.
4. Synthesize information from multiple sources.
5. Use library resources to prepare research projects.
6. Use research skills to gather & evaluate information useful in solving problems & making decisions.
7. Read consumer information & indicates appropriate action.
8. Read orally & silently for comprehension.

REASONING

1. Explain functions of persuasion in society.
2. Apply principles of abstract & analytical reasoning when evaluating information.
3. Use information & apply understandings to solve new problems in new situations when new directions or methods of solution are specified.
4. Generate criteria for making value judgments.
5. Use research sills to gather and evaluate information useful in solving problems in making decisions.
6. Use bibliographical data to discriminate between valid & invalid sources of information.
7. Detect & react appropriately to propaganda and biases.

SPEAKING/LISTENING

1. Use evidence to support contentions when presenting a point of view.
2. Demonstrate a sense of responsibility for participating in discussions & conversations.
3. Display a sense of responsibility for making appropriate contributions to discussions & conversations.
4. Use diction, vocabulary & language appropriate for the type of presentation & the nature of the audience when speaking publicly.
5. Demonstrate competence as an interviewer & interviewee.

WRITING

1. Write essays with a clear thesis statement and cohesion among paragraphs.
2. Experiment with writing various literary forms.
3. Use specific words in place of general words.
4. Write for a variety of audiences.
5. Use varied sentence structure to enhances and clarify meaning.
6. Write a multi-paragraph letter applying for job and/or seeking admittance to a college.
7. Write a documented informational paper.
8. Write effective sentences, paragraphs, & papers that reveal style appropriate for the writer's purpose & audience.
9. Write a persuasive composition.
10. Write a critical essay on a book, play, movie, & TV program.

MATH TOPICS – GRADES 9-12

NUMBERS AND NUMERATION

1. Identify axioms for the real number system.
2. Recognize the need for a variety of sets of numbers. (Counting, negative, rational, even, multiples, factors, etc.)
3. Locate examples of different sets of numbers on the number line.
4. Represent numbers in equivalent forms. (16=2x8=81-2=2 4)
5. Define the absolute value of a number.
6. Classify decimal representations of numbers as rational or irrational.
7. Write a decimal number in scientific notation and vice versa.

OPERATIONS

1. Multiply and divide using powers of 10.
2. Show the inverse relationship between addition and subtraction, and between multiplication and division.
3. Estimate the reasonableness of calculations when performing addition, subtraction, multiplication, and division.
4. Perform the basic operations with various sets of numbers, such as natural, whole, integer, rational, irrational, real, and complex.
5. Perform operations and simplifications involving absolute values.
6. Justify the use of calculators & computers for appropriate operations.
7. Express comparisons as ratios.
8. Round off numbers to given place values.
9. Isolate and solve formulas for any given variable.
10. Read and interpret grouping symbols.
11. Translate word phrases into mathematical expressions.
12. Evaluate trigonometric functions using tables or calculators.
13. Identify the ratios associated with the sine, cosine, and tangent of an angle.

MEASUREMENT

1. Use measuring instruments appropriate to the subject matter.
2. Explain the approximate nature of measurement.
3. Measure to the appropriate degree of accuracy.
4. Derive simple measurement formulas as in area & volume problems.
5. Apply measurement formulas.
6. Demonstrate that measurement is the repeated application of a standard unit.
7. Use the appropriate unit of measurement in applied problems.
8. Interpret and use measures of rate, such as miles per hour and meters per second.
9. Convert measurements to different units within the same system.
10. Use estimation to check the reasonableness of measurements.
11. Perform basic computations with measurements.
12. Evaluate the merits of different systems of measurements.
13. Identify the origins of different systems of measure.
14. Use calculators/computers to solve measurement problems.

GEOMETRY

1. Describe the significant properties of common geometric figures:
    a. sum of the measures of a triangle.
    b. base angles of an isosceles triangle.
    c. the Pythagorean Theorem.
    d. 30-60-90 and 45-45-90 triangle relationships.
    e. perimeter and area of triangles and rectangles.
    f. volume & area of prisms, pyramids, spheres, cylinders, cones.
2. Compare and categorize:
    a. right, supplementary, complementary, adjacent, vertical, alternate interior, and corresponding angles.
    b. parallel and perpendicular lines, rays and planes.
3. Perform the standard Euclidean constructions using compass and straight-edge.
4. Locate points and lines in two and three dimensional coordinate systems.
5. Apply the properties of congruence and similarity in two and three-dimensional situations.
6. Use LOGO, the Geometric Supposer and other appropriate computer software.
7. Describe some of the contributions made by Euclid, Pythagoras, Archimedes, and Descartes.

COLLECTION AND USE OF DATA

1. Calculate mean, median, mode, and range for a set of data.
2. Read, interpret, and construct tables and picto, bar, line, and circle graphs.
3. Identify, collect, organize, and interpret data.
4. Determine the number of possible outcomes using permutations, and combinations.
5. Analyze and solve simple one and two event probability problems.
6. Use a computer to generate, process, and analyze data.

PROBLEM SOLVING

Apply the following steps in problem solving:

1. Restate the problem.
2. Determine relevant information.
3. Determine concepts and operations to be used.
4. Apply problem solving strategies, such as:
    a) draw a diagram or make a model.
    b) make a table.
    c) find a pattern.
    d) work backwards.
    e) solve a simpler problem of the same type.
    f) use a formula, equation, or algorithm.
    g) use a calculators/computers.
5. Find a solution.
6. Check the solution.

SCIENCE TOPICS – GRADES 9-12

PROCESSES

1. Conduct safe and accurate laboratory investigations on most of the commonly known laws of science and communicate the results in a scientifically structured manner.
2. Demonstrate the ability to discover and interpret regularities by constructing and analyzing tables and graphs and entering data into various mathematical relationships.
3. From appropriately collected information hypothesize reasons WHY phenomena occur.
4. Apply scientific concepts and laboratory procedures to investigate a phenomenon.
5. Propose and justify a sound solution to a hypothetical problem, giving steps used in the reasoning process.
6. Give examples of scientific theories that have been disproved and scientific facts that have changed.

LIFE SCIENCE

1. Describe the relationship between organic compounds (such as proteins, lipids, carbohydrates) and nutritional/physiological needs.
2. Discuss the processes of cell respiration and photosynthesis, relating them to food chains and the interdependence of all living things.
3. Justify the statement that homeostasis is a universal process at all levels of organization in living systems.
4. Combining knowledge of cellular transport and cell structure, explain the on-going functioning of a cell.
5. Compare and contrast sexual and asexual reproduction including the advantages and disadvantages of each.
6. Illustrate how each individual can benefit from an understanding of the laws of heredity and the application of modern technology in the field of medical genetics.
7. Debate the ethical issues raised by recent advances in genetics, (e.g. recombinant DNA, cloning, gene therapy, eugenics, etc.).
8. Create a model to illustrate the structure of DNA and demonstrate the role of DNA in living systems.
9. Debate the validity of Darwin's theory of evolution and relate it to the concepts of adaptation and specification.
10. Devise a classification system when given diverse collections of objects.
11. Categorize according to phyla a collection of organisms representing the various kingdoms and justify the methodology.
12. Demonstrate through examples the relationship between form and function as it relates to living things.
13. Trace the changes in adaptive techniques of plants as they increase in complexity.
14. Trace the development of the major life functions through the various kingdoms.
15. Interpret the results of an experiment to investigate the effect(s) of an environmental variable on the behavior of an organism.
16. Debate environmental issues related to human influences (e.g. the use of pesticides and herbicides, endangered species, acid rain, toxic waste, pollution, etc.

17. Research a controversial issue such as world hunger, population control, euthanasia, embryo transfer, etc. Produce a paper which shows an understanding of all sides of the issue and which defends a personal position.
18. Investigate careers in various fields of biology.

PHYSICAL SCIENCE

1. Demonstrate through laboratory measurement of solids, liquids, and gasses the advantage of mass rather than volume as a measure of matter.
2. Demonstrate in the laboratory the use of physical and chemical properties to separate mixtures and compounds.
3. Investigate through quantitative experimentation several physical and chemical changes. Compare/contrast physical changes and chemical reactions, leading to the discovery of the Law of Conservation of Mass.
4. Collect data and study models which lead to the development of the Laws of Constant and Multiple Proportions.
5. Experience laboratory procedures (e.g. cloud chamber, Geiger counter, exposure of photographic plate) which lead toward the development of the atomic model of matter.
6. Investigate through experimentation various forms of energy (e.g. kinetic, potential, electrical, heath, etc.) and energy transfer leading to the discovery of the Law of Conservation of Energy.
7. Using a series of quantitative investigations with simple machines, illustrate the principles of mechanics (e.g. work, force, power, efficiency, mechanical advantage).
8. Apply the principle of Ohm's Law to everyday electrical devices. Calculate the cost of electrical usage of the devices.
9. Use a magnet, coil of wire, and galvanometer to construct a model generator. use the generator to explain the commercial production of electricity from hydro, fossil fuels, atomic fission and fusion. Debate the efficiency, cost, and consequences of each.
10. Investigate the nature and transmission of sound and light an apply these concepts to the world of work (e.g. laser, microscope, sonar, ultrasonic)
11. Utilize quantitative investigations of various heat transfer systems to develop an understanding of the concepts of specific heat, heat capacity, heat of fusion, heat of vaporization, and heat of combustion. Utilize these concepts to investigate the energy content of various fuels and foods.
12. Investigate the kinetic molecular theory and apply the theory to differentiate between heat and temperature and states of matter.

EARTH & SPACE SCIENCE

Earth Science:

1. Prepare a data table to show the nature and composition of the atmosphere. Use the data to describe weather variations, cycles, energy transfer and changes brought about by human activity.
2. Observe and measure atmospheric properties using simple instruments such as thermometers, psychometers, and barometers. Use the patterns of change in these properties to predict the next day's weather.

3. Perform experiments that demonstrate the unequal heating of land and water areas of the earth. Use the data along with the Earth's motions to describe the formation and movement of air masses, fronts, and storms.
4. Show how the contributions of Ptolemy, Copernicus, Brahe, Kepler, Galileo, and Newton have been instrumental in developing our present day model of the Universe.
5. Develop a system for measuring the positions of stars on any night. Through observations record the position of a star or groups of stars as they change during one night and over a period of several weeks. Relate this change to the motions of the Earth.
6. Compare the positions of the sun, moon, and Earth on a daily, monthly, and yearly basis. Discuss the interrelation of seasons, eclipses, phases of the moon, time, and tides to these changes in positions.
7. Compare planetary data from 1950 with that of 1980. Relate the changes to our space program.
8. Relate the spectral properties of a star to temperature, composition, motion, and evolution.
9. Use different types of maps, such as topographic, geologic, and those produced by remote sensing to show changes on the Earth's surface.
10. Explain the origin of landform and soils through a study of the processes and agents of weathering an erosion.
11. Apply the principle of uniformitarianism in determining the geologic history of individual rocks and sequences of rocks.
12. Identify and explain the evidence that supports the plate tectonic model. Use the plate tectonic model to describe the origin of rocks, volcanoes, earthquakes and mountains.
13. Relate the nature and composition of sea water and ocean sediments to the water cycle.
14. Describe how air pressure, wind, Coriolis force, and density differences produce ocean circulation.
15. Describe the interaction of sediments, energy, currents, and waves in the production of coastal features.
16. Read "Spaceship Earth" by Buckminster Fuller. Provide evidence that the earth is a closed system in space with limited resources. Plot a graph of world population growth and interpret the future of humankind in terms of exponential growth.

ENVIRONMENTAL SCIENCE

Chemistry:

1. Relate the concept of electron configuration to chemical bonding, molecular geometry, oxidation-reduction and periodicity.
2. Relate kinetic molecular theory to the physical states of matter and their behavior.
3. make stoichiometric calculations.
4. use the concept of solution equilibria to explain the differences between strong and weak acids and bases.
5. use redox potentials to explain electrochemical reactions.
6. Write correct equations to represent chemical and nuclear reactions and the accompanying energy transformations.
7. Discuss the consequences of chemical and nuclear changes.

Physics:

1. Use relationships between the laws of motion and forces to explain what happens to a person in a car that goes through acceleration, turning, and stopping.
2. Quantify work, power, and mechanical energy.
3. Construct diagrams that show how several forces act on an object.
4. Discuss how waves may be used to account for the properties of both sound and light.
5. Describe the operation of transformer and quantify the relationships that occur between the primary and secondary circuits.

Combined:

1. Relate physical and chemical principles to events and processes encountered outside the classroom.
2. Suggest an impact on society of recent advances in chemistry and physics.

SOCIAL STUDIES TOPICS – GRADES 9-12

CONTENT

2. Basic chronology of important developments and events, including those affecting women and minorities in American history
3. Analysis of cause and effect relationships of important events and developments in American history
4. Continuity and change in American institutions
5. Conflict and conflict resolution in the course of American history
6. Evidence in the investigation of American history
7. Vermont perspective in American history
8. Interpretation of American history
9. Influence of geography (landforms, bodies of water, natural resources, demographics, and climate on the course of American history
10. Significance of infrastructure (roads, navigable waterways, air routes, communications)
    Development of American economic system and its institutions (labor, corporation)
11. Development of political parties & interest groups & the role of public opinion
12. Power and distribution of resources
13. Making and interpreting constitutions
14. Political framework: legislative, executive, judicial
15. Concept of citizenship: evolution of rights & duties of citizenship
16. Decision-making at critical points in American history
17. American culture and subcultures (mores, beliefs, values): origins & transmissions
18. Cultural interaction in American history (dominant groups vs. minority groups, assimilation, isolation, diffusion)
19. Motivations of individuals and groups
20. American foreign policy
21. Basic chronology of important developments and events, including those effecting women and minorities in world history
22. Analysis of cause and effect relationships of important events and developments in world history
23. Continuity and change in various world cultures
24. Conflict and conflict resolution in various world cultures
25. Evidence in the investigation of world history
26. Interpretation of world history
27. Influence of geography (landforms, bodies of water, material resources, demographics, climate) on world history
28. Significance of place, names and map locations in world history
29. Significance of infrastructure (roads, waterways, air routes, communication)
30. Comparison and contrast of traditional command and market economic systems throughout world history
31. Influence of money & banking on the distribution of goods & services
32. Power and the distribution of resources
33. Development of world political system and ideologies
34. Comparison of legal and governmental system of world cultures
35. Concept of citizenship and the evolution of rights and duties of citizenship in world cultures

36. Decision-making at critical points in world history
37. Comparison of culture in world history
38. Cultural interaction in world history (dominant groups vs. minority groups, assimilation, isolation, diffusion)
39. Basic chronology of important developments and events, including those affecting women and minorities in Vermont history
40. Analysis of cause and effect relationships of important events and developments in Vermont history
41. Continuity and change in Vermont institutions
42. Conflict and conflict resolution in the course of Vermont history
43. Evidence in the investigation of Vermont history
44. Interpretations of Vermont history
45. Development of Vermont political system and ideologies
46. Development of political parties and interest groups and the role of public opinion
47. Power and the distribution of resources
48. Making and interpreting the Vermont Constitution
49. Political framework: legislative, executive, and judicial; federal-state relations
50. Concept of citizenship: evolution of rights and duties of citizens
51. Decision-making at critical points in Vermont history
52. Influence of geography (landforms, bodies of water, natural resources, demographics, climate) on the course of Vermont history
53. Significance of place, names and geographic locations
54. Significance of infrastructure (roads, waterways, air routes, railroads, communications)
55. Development of Vermont economic base: agriculture, tourism & light industry
56. Development of Vermont economic values: independence & interdependence
57. Critical social, political & economic issues facing Vermont
58. Vermont's cultures & subcultures (mores, norms, beliefs, values): origins & transmissions
59. Vermont-Canadian relations
60. Overview of the traditions & cultures of the Abenaki people

GEOGRAPHY

1. Locate and label on map places of historical significance
2. Assess influence of geography of course of American history
3. Evaluate the role of the growth of America's infrastructure on its economic development
4. Cite ways in which cultural differences arise as the result of geographic location
5. Locate on a map & globe the major land & water masses, continents and nations
6. Locate on a map & globe the land of origins of America' immigrant groups
7. Identify major changes in global, political boundaries from World War I to the present
8. Assess the influence of geography on the course of Vermont history; exploration & settlement, Native American settlements, development of economic base & the Green Mountain axis on political development
9. Assess the influence of Vermont's physical geography on the development of its infrastructure

HISTORY

1. List important periods in chronological order
2. Analyze cause & effect relationships of and among important events and developments
3. Trace change in one or more American institutions
4. Analyze the various civil rights movements
5. Compare & contrast similarities & differences of two historical periods
6. Analyze causes and resolutions of America's domestic socio-economic & political conflicts
7. Evaluate the legitimacy and significance of various forms of historical evidence
8. Explain how events that took place in Vermont related to important national events
9. Trace America's foreign policy and illustrate the impact of American foreign policy on domestic events
10. Compare, contrast & evaluate conflicting interpretations of historical events
11. Cite ways in which cultural differences arise as the result of historical events
12. Identify the major historical events and trends that have shaped the global development of culture
13. Evaluate the forces that can cause political, economic, social, technological & environmental change
14. Compare different cultures at specific times in world history
15. Analyze cause & effect relationships of & among important events & developments in world history.
16. Compare change & rate of change in various world cultures.
17. Analyze causes & resolutions of internal socio-economics & political conflicts in various culture & various time periods.
18. Explain how events that took place in one culture related to important global events at the same time.
19. Trace how a civilization's (nation, state, etc.) foreign policy affects its domestic policy.
20. List important periods of Vermont history in chronological order.
21. Analyze cause & effect relationships in important events and developments in Vermont history.
22. Trace continuity & change in one or more Vermont institutions.
23. Analyze causes & resolutions of Vermont's domestic, social, economic, & political conflicts.
24. Explain how events that took place globally and/or nationally related to events in Vermont.
25. Analyze & evaluate conflicting interpretation of Vermont history.

ECONOMICS

1. Trace development of the American economic system with specific reference to labor, agriculture, & industry.
2. Illustrate how the values of independent relate to American economic development.
3. Trace the cycle of boom & bust in American economic history.
4. Demonstrate the relationship between the development of capital & labor in the growth of the American economy.
5. Analyze global economic interdependence in the areas of food, energy, capital, and other critical natural resources.

6. Describe the global aspects of Vermont's economy.
7. Compare & contrast traditional command & market economic system at a period of time in world history.
8. Describe two examples of a culture's economic system changing from one model to another model.
9. Illustrate & discuss with historical examples fou7r economic concepts such as competition, cooperation, independence, and interdependence.
10. Analyze the role of local, regional, national and international trade in economic history of the world.
11. Analyze the role of agriculture, tourism, and light industry in the development of Vermont's economy.
12. Illustrate how values of independence and interdependence relate to Vermont's economic development.
13. Evaluate the reasons for the economic disparity between men and women in the world, the Unites States, and Vermont.

LAW & GOVERNMENT

1. Illustrate decision-making processes & the use of power at critical points in American history.
2. Trace the origins of U.S. Constitution, Declaration of Independence, and Bill of Rights.
3. Assess the impact of the growth of government in American life.
4. Assess the impact of judicial review of the Constitution on American life.
5. Compare and contrast the rights of citizens enumerated in U.S. Constitution and Vermont Constitution.
6. Trace the development of political parties, interest groups & public opinion in American history.
7. Analyze basic values inherit in American political ideologies.
8. Analyze alternative ways to manage international conflict.
9. Evaluate the effectiveness of United Nations' role as peacemaker.
10. Analyze the source, goals, and methods of the exercise of power by power figures in a variety of cultures during several periods of world history.
11. Define & compare various forms of government throughout world history.
12. Compare and contrast philosophies of the ideologies of government in various cultures in several periods throughout world history.
13. Define the concept of citizenship, and trace the evolution of rights and duties of citizenship in world culture.
14. Propose and defend an alternative organization to the United Nations.
15. Trace the development of Vermont's political system and political tradition.
16. Trace the development of Vermont's political parties, interest groups, and the role of public opinion.
17. Illustrate decision-making processes and the use of power at critical points in Vermont history.
18. Trace origin of the Vermont Constitution & government.
19. Assess the impact of judicial review of Vermont's Constitution on the lives of Vermonters.
20. Identify and analyze critical issues of local-state and state-federal relations in Vermont history.

21. Propose solutions to critical social, political, and economic issues facing Vermont's people and government.

SOCIOLOGY

1. Compare & contrast lifestyles of mainstream American culture in at least two different periods.
2. Compare & contrast lifestyle of mainstream American culture and a minority culture at one particular time American history.
3. Compose a list of values for incorporation in a future global political environment.
4. Demonstrate that societies create a culture as a means of adapting to environment.
5. Identify common problems in difference cultural settings.
6. Analyze how cultures have interacted with particular attention to minority vs. majority culture, diffusion, and assimilation.
7. Compare and contrast the impact of science and technology on religion, education, socialization, family life, art and music I several cultures and in several time periods.
8. Define Vermont's cultures and subcultures during several time periods.
9. Evaluate the impact of the civil rights movement and women's movement on American culture.
10. Analyze the Abenaki presence throughout Vermont's history.
11. Compare and contrast assimilation, amalgamation, and cultural pluralism as patterns of ethnic and racial relations.
12. Discuss the impact of population changes and movements upon social change in the United States, Vermont and the world
13. Analyze a social movement using sociological principles
14. Describe some possible solutions for dealing with the problems of aging in American history.
15. Analyze the impact which American values have played in causing environmental pollution and resource depletion.

ANTHROPOLOGY

1. Explain how Americans have assimilated features of other cultures and how American culture has impacted on foreign cultures.
2. Identify the subcultures within the classroom, school and community.
3. Identify the universal elements of culture.
4. Compare and contrast the beliefs and values of different cultures.
5. Cite contributions (technology, beliefs, institutions) made by America to global culture.
6. Explain how Vermonters have assimilated features of other cultures and how Vermont's culture has impacted on other cultures.

PSYCHOLOGY

1. Analyze the motivations of important individuals and groups in critical situations in American history.
2. Describe and intellectually support personal beliefs about such questions as war and peace, inequalities in the distribution of the world's resources, etc.
3. Analyze the motivation of important individuals and groups, including women and minorities, in critical situations in Vermont, the United States and world history.